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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,528	06/19/2001	Oleg Wasynczuk	16410-108	2652

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EXAMINER

SHARON, AYAL I

ART UNIT PAPER NUMBER

2123

DATE MAILED: 12/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/884,528

Applicant(s)

WASYNCZUK ET AL.

Examiner

Ayal I. Sharon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13, 16-20, 24-26, 29 and 31-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13, 16-20, 24-26, 29, and 31-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Introduction

1. Claims 1-13, 16-20, 24-26, and 29-44 of U.S. Application 09/884,528 are currently pending.
2. The application was originally filed on 6/19/2001. The application claims priority to provisional application 60/212,695, filed on 6/19/2000.

Information Disclosure Statement

3. In the Amendments filed on 4/18/2005 and 1/30/06, the Applicants refer to an article titled "Distributed Simulation" from Aerospace Engineering, Nov. 2004. The amendment states (see p.16, paragraph 2) that the article was "submitted herewith", however, the Article is not in the official record.
4. In addition, the *Technology Horizons* article cited by the Applicants in p.21 of the Amendment filed 1/30/06 is not in the official record, despite Applicants' assertion in the amendment filed on 9/5/2006 that the articles were attachments D and E of the Declaration of Paul C. Krause filed on 1/17/2006.
5. Examiner again requests copies of these articles.

Allowable Subject Matter

6. Claims 16-18, 31, and 34-35 have not been rejected based on prior art. They would be allowable if rewritten in independent form including all of the limitations of the base claim and all intervening claims, and if all rejections of the independent claims (including 35 U.S.C. §101 rejections) were overcome.
7. The following statements are reasons for the indication of allowable subject matter.
8. None of the cited prior art references expressly teach the unique combination of sets and subsets that is claimed in the limitations of claim 16. Claim 16, however, is rejected under 35 U.S.C. §101.
9. Claims 17-18 and 34-35 depend from claim 16.

Claim Rejections - 35 USC § 101

10. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

11. **Claims 1-13, 16-20, and 24-26, 29-42 are rejected under 35 U.S.C. 101**

because the claimed invention is directed to non-statutory subject matter.

12. The claims lack a concrete, tangible, and useful result.
13. An invention which is eligible for patenting under 35 U.S.C. § 101 is in the “useful arts” when it is a machine, manufacture, process or composition of matter, which produces a concrete, tangible, and useful result.
14. One may not patent every “substantial practical application” of an idea, law of nature or natural phenomena because such a patent “in practical effect be a

patent on the [idea, law of nature or natural phenomena] itself.” Gottschalk v. Benson, 409 U.S. 63, 71-72, 175 USPQ 673, 676 (1972).

15. Moreover, whether a claim recites a machine implemented process is not determinative of whether that process claim is statutory. Thus, a claim that is nothing more than a machine-implemented abstract idea is not statutory. See Benson, 409 U.S. 63, 175 USPQ 673 (finding machine-implemented method of converting binary-coded decimal numbers into pure binary numbers unpatentable).
16. The fundamental test for patent eligibility is to determine whether the claimed invention produces a **“useful, concrete and tangible result.”** See State Street Bank & Trust Co. v. Signature Financial Group Inc., 149 F. 3d 1368, 47 USPQ2d 1596 (Fed. Cir. 1998) and AT&T Corp. v. Excel Communications, Inc., 172 F.3d 1352, 50 USPQ2d 1447 (Fed. Cir. 1999). In these decisions, the court found that the claimed invention as a whole must accomplish a practical application. That is, it must produce a **“useful, concrete and tangible result.”**
17. See State Street, 149 F.3d at 1373-74, 47 USPQ2d at 1601-02. (“[T]he transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces ‘a useful, concrete and tangible result’ – a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades”).

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18. See also AT&T, 172 F.3d at 1358, 50 USPQ2d at 1452 (Claims drawn to a long-distance telephone billing process containing mathematical algorithms were held to be patentable subject matter because the process used the algorithm to produce a useful, concrete, tangible result without preempting other uses of the mathematical principle).

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

20. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

21. The prior art used for these rejections is:

a. Defense Modeling and Simulation Office (DMSO), "Facility for Distributed Simulation Systems: Proposed Request for Comments". Version 1.2. June 1998. Chapters 1, 8. ("**DMSO Facility reference**").

b. Object Management Group. "CORBA BASICS®". ©1997-2004.

<http://www.omg.org/gettingstarted/corbafaq.htm>. Printed 11/12/2004.

("OMG CORBA Reference").

22. The prior art was originally cited in PTO-892 form dated 11/17/2004.

23. The claim rejections are hereby summarized for Applicants' convenience. The detailed rejections follow.

24. Claims 1-13, 19-20, 25-26, 29, 32-33 and 39-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over DMSO Facility reference in view of OMG CORBA Reference.

25. In regards to independent claim 1, the DMSO Facility reference teaches the following limitations:

1. (Currently Amended) A computer-implemented system, comprising:
a first executing process that:
 implements a first continuous-time model to simulate a first physical subsystem,
the
 first model being programmed in a first language and having a first state variable;
and
 sends a first series of state-related numerical values, each numerical value reflecting information relating to the value of the first state variable at a different point t_m in simulation time in the first model; and
a second executing process that:
 receives said first series of state-related numerical values ... and
 implements a second continuous-time model to simulate a second physical subsystem,
the second model being programmed in a second language and taking as an input values from said first series of state-related numerical values; and
 outputs data representative of a state of the second continuous-time model.

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(See especially "Section 1. Overview" in pp.25-27 of the DSMO Facility reference.)

However, while the DSMO Facility reference expressly teaches the use of CORBA (see pp.16-17, "Section 0.8"), the DSMO Facility reference does not expressly teach the following limitation:

receives said first series of state-related numerical values from said first executing process without said first series of state-related numerical values passing through a central communication process; and

The OMG CORBA Reference, on the other hand, expressly teaches the following (See the section titled "What is CORBA? What Does it Do?"):

Using the standard protocol IIOP, a CORBA-based program from any vendor, on almost any computer, operating system, programming language, and network, can interoperate with a CORBA-based program from the same or another vendor, on almost any other computer, operating system, programming language, and network.

Examiner also notes that the OMG CORBA reference teaches the use of an Object Request Broker (ORB). (See Fig.1 of OMG CORBA). Examiner interprets that CORBA is decentralized, and therefore does not correspond to the claimed "central communication process".

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of DMSO Reference with those of OMG CORBA, because DMSO Expressly teaches the use of CORBA (see pp.16-17, "Section 0.8" of DMSO Facility reference).

26. In regards to dependant Claims 2-8 they are rejected on the same grounds as Claim 1.

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27. In regards to independent Claim 9, and its dependent Claims 10-13, 19-20, 25-26, and 29 and 32-33 they are rejected on the same grounds as Claim 1.

28. In regards to Claim 39, the following limitations are rejected on the same grounds as presented in regards to Claim 1:

39. (Currently Amended) A computer-implemented system for simulating a physical system, the physical system comprising two or more subsystems, the computing system comprising a plurality n of computing devices, each simulating a subsystem of the physical system, wherein:

at least one subsystem is simulated by computationally solving a system of ordinary differential equations;

each subsystem simulation either

provides a series of output messages to another subsystem simulation, where the output messages encode state-related data from the subsystem, or

receives a series of input messages from another subsystem simulation, where the input messages encode state-related data from the other subsystem simulation, or

both provides a series of output messages to another subsystem simulation, where the output messages encode state-related data from the subsystem, and receives a series of input messages from another subsystem simulation, where the input messages encode state-related data from the other subsystem simulation; and

the computing system provides an output signal from at least one of the subsystem simulations;

On the other hand, the cited prior art does not expressly teach the following limitations:

wherein the simulation of the physical system occurs with a speed greater than $O(n)$ times the speed of the simulation using a single one of the computing devices.

Examiner finds this limitation to be inherent to all distributed multi-processor computing systems.

29. In regards to Claim 40, the following limitations are rejected on the same grounds as presented in regards to Claim 1:

40. (Currently Amended) In a computer-implemented distributed simulation of a physical system, the improvement comprising: running a continuous-time simulation of the physical system in a set of n computing devices; i and

outputting data representative of a state of the physical system simulation; wherein the running occurs with a speed greater than $O(n)$ times the speed of the simulation using a single one of the computing devices.

Examiner finds the "speed greater than $O(n)$... using a single one of the computing devices" limitation to be inherent to all distributed multi-processor computing systems.

30. Claims 41-44 are rejected on the same grounds as claim 40.

31. Claims 24 and 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over DMSO Facility reference in view of OMG CORBA Reference, and further in view of Official Notice.

32. In regards to Claim 24,

24. (Previously Presented) The method of claim 20, wherein said displaying comprises graphing a function of the first state-related variable versus an independent variable.

While the cited prior art does not expressly teach graphing, Official Notice is given that it was old and well known at the time of the invention to graph data. It would have been obvious to one of ordinary skill in the art at the time the invention was made to graph data because visually represented information is more easily understood.

33. In regards to Claim 36,

36. (Previously Presented) The system of claim 24, wherein the independent variable is time.

While the cited prior art does not expressly teach graphing, Official Notice is given that it was old and well known at the time of the invention to graph data versus time. It would have been obvious to one of ordinary skill in the art at the

time the invention was made to graph data because visually represented information is more easily understood.

34. Claims 37-38 are rejected on the same grounds as claim 36.

Response to Arguments

Re: Request for Referenced Articles

35. Examiner again requests copies of these articles.

Re: Claim Rejections - 35 USC § 101

36. The Examiner is maintaining the 35 USC § 101 rejections based on the lack of concrete, useful, tangible results.

37. Examiner finds that producing “data representing the state of a computer-simulated physical subsystem” is not tangible.

38. According to MPEP § 2106 (IV)(C)(2)(2)(b), “the tangible requirement does require that the claim must recite more than a 35 U.S.C. 101 judicial exception, in that the process claim must set forth a practical application of that judicial exception to produce a real-world result. Gottschalk v. Benson, 409 U.S. 63, 71-72, 175 USPQ 673, 676 (1972). (invention ineligible because had ‘no substantial practical application.’).” The same section of the MPEP also states that “the opposite meaning of ‘tangible’ is ‘abstract.’” Examiner finds that “the state of a computer-simulated physical subsystem” is an abstraction, not a real-world

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result. The claims do not recite any "substantial practical application" for "data representing the state of a computer-simulated physical subsystem."

39. Moreover, the claims do not produce a useful result because the claims do not recite a utility that is (i) specific, (ii) substantial and (iii) credible. See MPEP § 2107, and *In re Fisher*, 421 F.3d 1365, 1372, and 76 USPQ2d 1225, 1230 (Fed. Cir. 2005) (citing the Utility Guidelines with approval for interpretation of "specific" and "substantial").

40. Moreover, according to MPEP § 2106 (IV)(C)(2)(2)(a),

In addition, when the examiner has reason to believe that the claim is not for a practical application that produces a useful result, the claim should be rejected, thus requiring the applicant to distinguish the claim from the three 35 U.S.C. 101 judicial exceptions to patentable subject matter by specifically reciting in the claim the practical application. In such cases, statements in the specification describing a practical application may not be sufficient to satisfy the requirements for section 101 with respect to the claimed invention. Likewise, a claim that can be read so broadly as to include statutory and nonstatutory subject matter must be amended to limit the claim to a practical application. In other words, if the specification discloses a practical application of a section 101 judicial exception, but the claim is broader than the disclosure such that it does not require a practical application, then the claim must be rejected.

The instant claims lack any recitation of a practical application. A result of "data representing the state of a computer-simulated physical subsystem" is not specific or substantial. Compare with State Street Bank & Trust Co. v. Signature Financial Group Inc., 149 F. 3d 1368, 1373-74 (Fed. Cir. 1998), and AT&T Corp. v. Excel Communications, Inc., 172 F.3d 1352, 1358 (Fed. Cir. 1999). In State Street, the 'useful, concrete and tangible result' was a final share price

momentarily fixed for recording and reporting purposes. In AT&T, the 'useful, concrete, tangible result' was a PIC code used in telephone billing networks.

41. In the instant claims, on the other hand, recite the output as being "the state of a computer-simulated physical subsystem". This output is not sufficient or substantial, but rather appears to be an attempt to pre-empt all substantial practical applications. According to MPEP § 2106 (IV)(C)(2)(3), "One may not patent a process that comprises every 'substantial practical application' of an abstract idea, because such a patent 'in practical effect would be a patent on the [abstract idea] itself.'" See Benson, 409 U.S. at 71-72. The claimed "state of a computer-simulated physical subsystem" could refer to many unrelated substantial practical applications, such as determining whether the state of the physical subsystem is on or off, damaged or not not-damaged, responding or not responding, hot or cold, fast or slow, high or low, heavy or light, etc. The claims are therefore are rejected under 35 U.S.C. § 101.

Re: Claim Rejections - 35 USC § 112

42. Regarding the 35 USC § 112, first paragraph rejections of claims 1-13, 16-20, 24-26, and 29-38, Examiner agrees with applicants' argument (see p.17 of the amendment filed 9/5/2006) that "passing data from one computer executing process to another is a very basic operation in the field of computer science, and as such no specific instruction how to do this is required in Applicants' disclosure." Examiner accepts Applicants' admission that this feature is old and well known, and therefore not novel. Examiner has withdrawn the rejection.

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43. Regarding the 35 USC § 112, first paragraph rejections of claims 30-31, claim 30 has been cancelled.

44. Examiner has withdrawn the rejection of claim 31, because Examiner agrees with applicants' argument (see p.19 of the amendment filed 9/5/2006) that the claimed numerical integration techniques are taught in the specification at paragraph [0076].

45. Regarding the 35 USC § 112, first paragraph rejections of claims 39-44, Examiner has found applicants' arguments to be persuasive (see pp.19-20 of the amendment filed 9/5/2006). Examiner has withdrawn the rejections.

Re: Claim Rejections - 35 USC § 103

46. Examiner respectfully disagrees with applicants' arguments regarding the 35 USC § 103 rejections. The applicants argue (see p.21 of the amendment filed 9/5/2006 - emphasis in the original) that the "OMG CORBA's ORB is not a simulation process", therefore if all of the state-related numerical values passed between the simulation processes must pass through the ORB, then the ORB is a "central communication process" within the meaning of that term in Applicants' claims."

47. In particular, Examiner notes that the OMG CORBA Reference expressly teaches the following (See the section titled "What is CORBA? What Does it Do?"):

Using the standard protocol IIOP, a CORBA-based program from any vendor, on almost any computer, operating system, programming

language, and network, can interoperate with a CORBA-based program from the same or another vendor, on almost any other computer, operating system, programming language, and network.

48. Examiner finds that this functionality of OMG CORBA's ORB corresponds to the functionality of the dynamically linked library (.DLL) and operating system API recited in paragraph [0045] of the instant specification as an enablement for the claimed feature. Neither a dynamically linked library (.DLL), nor an operating system API, is a simulation process. According to the applicants, neither a dynamically linked library (.DLL), nor an operating system API is a "central communication process." Since OMG CORBA's ORB is non-centralized, and not necessarily simulation, it is functionally equivalent to both a dynamically linked library (.DLL) and an operating system API, and reads on the claimed limitations.
49. In regards to the date of the reference, applicants argue that the OMG CORBA Reference does not qualify as prior art because the Examiner printed it from the internet on 11/12/2004. Examiner respectfully disagrees. The reference has the following copyright dates: ©1997-2004. Therefore, the date of the reference is 1997, which precedes the 6/19/2000 priority filing date of the instant application.
50. The Examiner is therefore maintaining the 35 USC § 103 rejections.

Conclusion

51. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ayal I. Sharon whose telephone number is (571) 272-3714. The examiner can normally be reached on Monday through Thursday, and the first Friday of a biweek, 8:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached at (571) 272-3753.

Any response to this office action should be faxed to (703) 872-9306, or mailed to:

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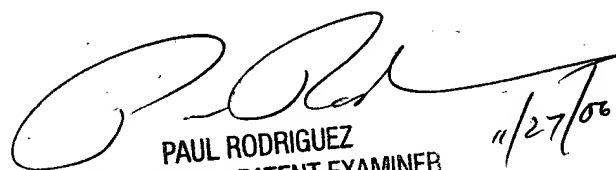
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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Tech Center 2100 Receptionist, whose telephone number is (571) 272-2100.

Ayal I. Sharon
Art Unit 2123
November 27, 2006


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11/27/06